

Muon system: database workshop

- What we do with databases
- Browsing tools we might like
- Existing interface software from Vladimir Lipaev (IHEP)

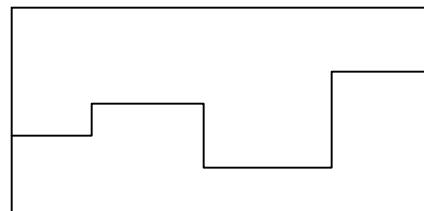
Muon System Databases

- What we have in databases:
 - Online hardware parameters: delay settings, masks, thresholds, ...
 - Calibration constants (used online): tzeros, pedestals, gains
 - Calibration constants (used offline): delta-tzeros, gain ratios
- How we use them:
 - Extract values from database and download to hardware
 - Analyze pulser data and put calibration constants into database
 - Analyze beam data and put calibration corrections into database

A few wish list items

- Compare calibration constants graphically with reference set.

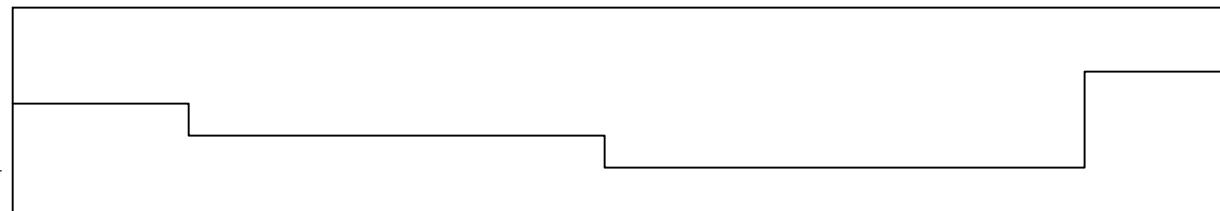
New-Old



Channel #

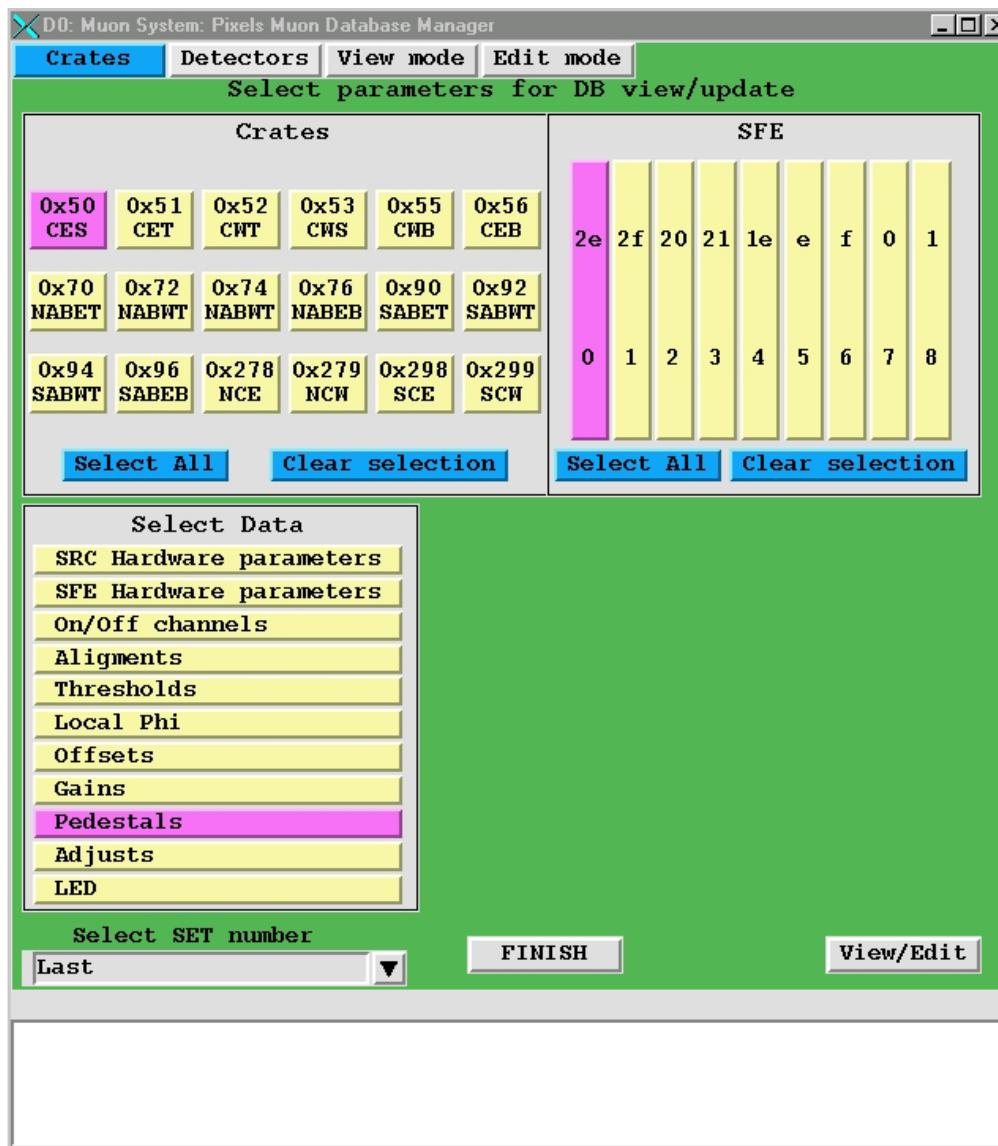
- Track the behavior of a constant vs. run number:

Tzero for
one channel



Run #

Muon Scint online database/downloading gui: module & function selection



Muon Scint online db/dl gui: hardware params

XDO: Muon System: Pixels Muon Database Manager

View mode Edit mode

Select parameters for DB view/update

Crates

| | | | | | |
|---------------|---------------|---------------|---------------|---------------|---------------|
| 0x50 CES | 0x51 CET | 0x52 CWT | 0x53 CWS | 0x55 CWB | 0x56 CEB |
| 0x70 NABET | 0x72 NABWT | 0x74 NABWT | 0x76 NABEB | 0x90 SABET | 0x92 SABWT |
| 0x94 SABWT | 0x96 SABEB | 0x278 NCE | 0x279 NCW | 0x298 SCE | 0x299 SCW |

Select All Clear selection

Select Data

SRC Hardware parameters

SFE Hardware parameters

On/Off channels

Alignments

Thresholds

Local Phi

Offsets

Gains

Pedestals

Adjusts

LED

L1TRGLTNCY, PIPELINE
ESR 1, ESR 2
SFE mask, timeout
L1 trigger latency preset
Test pulse crossing preset
Test pulse L1 crossing preset
Test pulse coarse delay preset
Time between repeated test pulse
Local L1 delay;
L2, L3 hotlink CSR
IRQ7, IRQ6, IRQ5 vectors

SRC CSR0

Select SET number

Last ▼ FINISH Edit

Read 'SRC Hardware parameters' from Database ... Done

Update

SRC Hardware parameters: Crate 0x50

| | |
|---|----|
| L1TRGLTNCY (dec) | 33 |
| PIPELINE (dec) | |
| TME_RP (dec) | |
| ESR: Flag for real data event [ESR1_EVTYP] (hex) | 0 |
| ESR: Flag for 1/n data [ESR1_SCALE] (hex) | 0 |
| ESR: Alignment ID field [ESR1_ALID] (hex) | 0 |
| Calibration const ID field [ESR2_CLID] (hex) | 0 |
| SFE mask [sfe_mask] (hex) | 0 |
| SFE timeout [to_set] (hex) | fe |
| L1 trigger latency preset [lat_pre] (dec) | |
| Test pulse crossing preset [tp_pre] (dec) | |
| Test pulse L1 crossing preset [lltst_pre] (dec) | |
| Test pulse coarse delay preset [tp_dly_pre] (hex) | 13 |
| First Xing and synch gap delay [beam_dly] (dec) | 16 |
| Time between repeated test pulse [tp_rep_pre] (dec) | 1 |
| Local L1 delay [loc_l1_dly] (dec) | |
| L2 hotlink CSR [12_hl] (hex) | 1b |
| L3 hotlink CSR [13_hl] (hex) | 1b |
| IRQ7 vector (dec) | 65 |
| IRQ6 vector (dec) | 66 |
| IRQ5 vector (dec) | 64 |

Muon Scint online db/dl gui: gates

X0: Muon System: Pixels Muon Database Manager

View mode | Edit mode

Select parameters for DB view/update

| Crates | | | | | |
|---------------|---------------|---------------|---------------|---------------|---------------|
| 0x50 CES | 0x51 CET | 0x52 CWT | 0x53 CWS | 0x55 CWB | 0x56 CEB |
| 0x70 NABET | 0x72 NABWT | 0x74 NABWT | 0x76 NABEB | 0x90 SABET | 0x92 SABWT |
| 0x94 SABWT | 0x96 SABEB | 0x278 NCE | 0x279 NCH | 0x298 SCE | 0x299 SCW |

Select All | Clear selection

Select Data

- SRC Hardware parameters
- SFE Hardware parameters**
- On/Off channels
- Alignments
- Thresholds
- Local Phi
- Offsets
- Gains
- Pedestals
- Adjusts
- LED

Select SET number

Last ▾ FINISH Edit

Read 'SRC Hardware parameters' from Database ... Done
 Read 'SFE Hardware parameters' from Database ... Done

SFE Hardware parameters: Crate 0x50

SFE Group A Analog Gate: Delay setting of gate
 (dec) 0 0 0 0 0 0 0 0 0
 0 1 2 3 4 5 6 7 8

SFE Group A Analog Gate: Width setting of gate
 (dec) 88 88 88 88 88 88 88 88 88
 0 1 2 3 4 5 6 7 8

SFE Group B Analog Gate: Delay setting of gate
 (dec) 0 0 0 0 0 0 0 0 0
 0 1 2 3 4 5 6 7 8

SFE Group B Analog Gate: Width setting of gate
 (dec) 88 88 88 88 88 88 88 88 88
 0 1 2 3 4 5 6 7 8

SFE Group C Analog Gate: Delay setting of gate
 (dec) 0 0 0 0 0 0 0 0 0
 0 1 2 3 4 5 6 7 8

SFE Group C Analog Gate: Width setting of gate
 (dec) 88 88 88 88 88 88 88 88 88
 0 1 2 3 4 5 6 7 8

Common value for each SFE:

Update

Muon Scint online db/dl gui: pedestals

XDO: Muon System: Pixels Muon Database Manager

Crates **Detectors** **View mode** **Edit mode**

Select parameters for DB view/update

Select layer
South North

Select octant
E W N S

Select all Clear sel. Select All Clear selection

Select Data
SRC Hardware parameters
SFE Hardware parameters
On/Off channels
Alignments
Thresholds
Local Phi
Offsets
Gains
Pedestals
Adjusts
LED

Select SET number
Last FINISH Edit

Read 'SRC Hardware parameters' from Database ... Done
Read 'SFE Hardware parameters' from Database ... Done
Read 'Pedestals' from Database ... Done
Read 'List dead channels' from Database ... Done
Read 'On/Off channels' from Database ... Done

| Pedestals(Forward MS) : sc1 | | | | | | | | | | | |
|-----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Set for all marked channels: Value:
Error:
Status:

Update Select all
Clear selection

Muon Scint online db/dl gui: gains

XDO: Muon System: Pixels Muon Database Manager

Crates Detectors View mode Edit mode

Select parameters for DB view/update

| Crates | | | | | | SFE | | | | | |
|--|---------------|---------------|---------------|---------------|---------------|-----|--|--|--|--|--|
| 0x50 CES | 0x51 CET | 0x52 CWT | 0x53 CWS | 0x55 CWB | 0x56 CEB | | | | | | |
| 0x70 NABET | 0x72 NABWT | 0x74 NABWT | 0x76 NABEB | 0x90 SABET | 0x92 SABWT | | | | | | |
| 0x94 SABWT | 0x96 SABEB | 0x278 NCE | 0x279 NCW | 0x298 SCE | 0x299 SCW | | | | | | |
| Select All Clear selection | | | | | | | | | | | |

Select Data

- SRC Hardware parameters
- SFE Hardware parameters
- On/Off channels
- Alignments
- Thresholds
- Local Phi
- Offsets
- Gains**
- Pedestals
- Adjusts
- LED

Select SET number

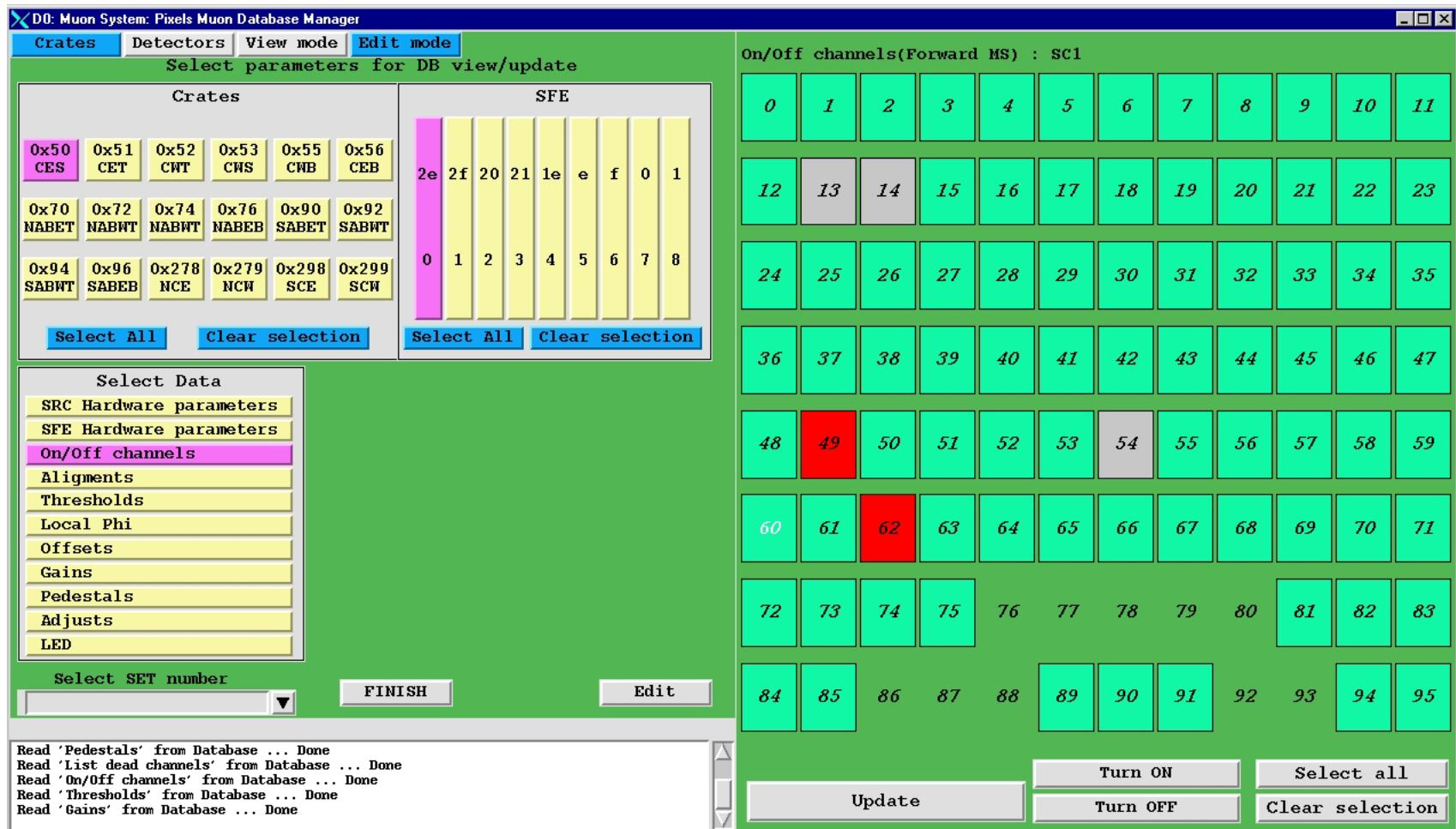
Last ▾ FINISH View

Read 'Pedestals' from Database ... Done
 Read 'List dead channels' from Database ... Done
 Read 'On/Off channels' from Database ... Done
 Read 'Thresholds' from Database ... Done
 Read 'Gains' from Database ... Done

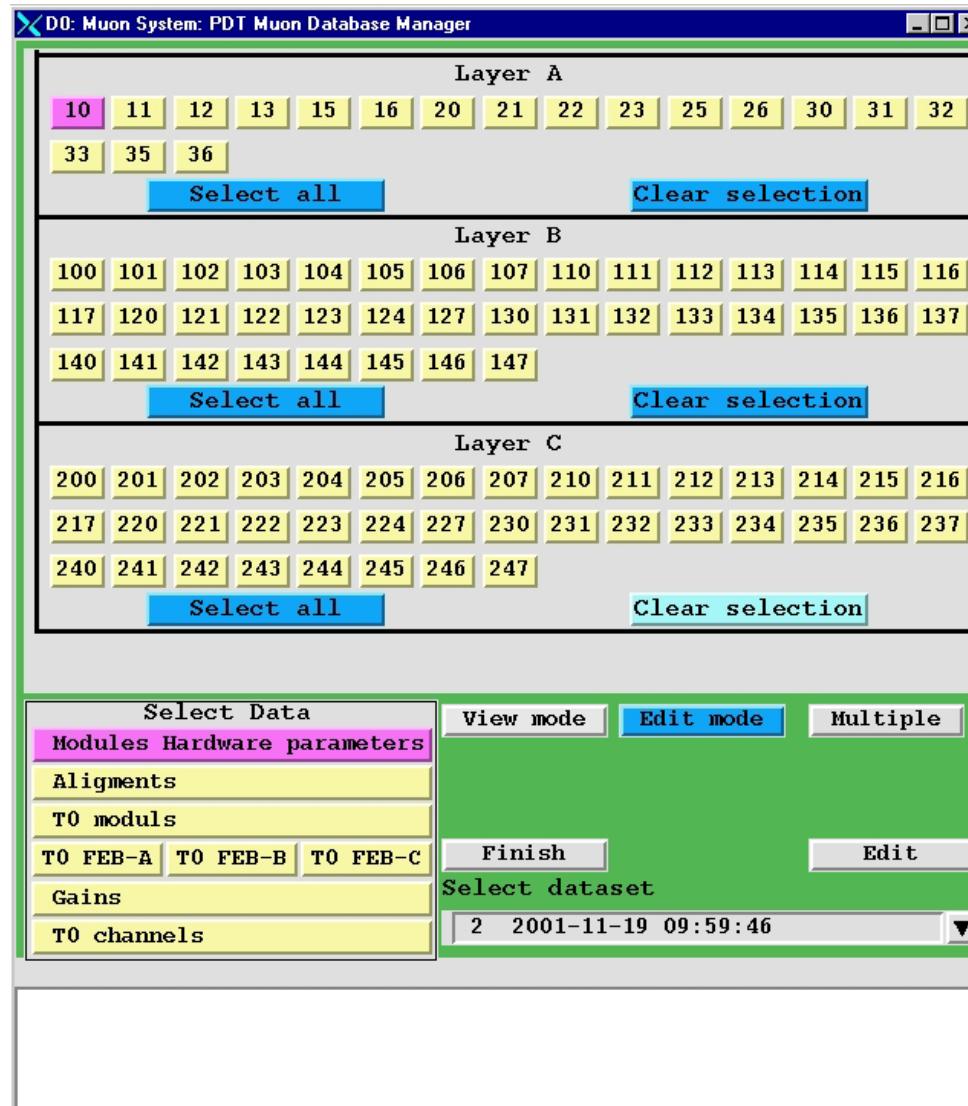
| Gain | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
|-------------------------------|------|------|------|------|------|------|------|-------|
| Error | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
| Status | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
| Gains Chan Crate 0x52 SFE 0x5 | | | | | | | | |
| Chan | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Gain | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Error | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Status | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Chan | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Gain | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
| Error | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
| Status | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
| Chan | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| Gain | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Error | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Status | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Chan | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Gain | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
| Error | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
| Status | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
| Chan | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 |
| Gain | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Error | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Status | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Chan | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| Gain | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
| Error | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |
| Status | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | +0.00 |

Clear Read file Save to file Exit

Muon Scint online db/dl gui: on/off channels



Muon PDT online db/dl gui: selecting modules



Muon PDT online db/dl gui: hardware params

XDO: Muon System: PDT Muon Database Manager

| Layer A | | | | | | | | | | | | | | | |
|-------------------|----|----|----|----|----|----|----|------------------------|----|----|----|----|----|----|--|
| 10 | 11 | 12 | 13 | 15 | 16 | 20 | 21 | 22 | 23 | 25 | 26 | 30 | 31 | 32 | |
| 33 | 35 | 36 | | | | | | | | | | | | | |
| Select all | | | | | | | | Clear selection | | | | | | | |

| Layer B | | | | | | | | | | | | | | | |
|-------------------|-----|-----|-----|-----|-----|-----|-----|------------------------|-----|-----|-----|-----|-----|-----|--|
| 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | |
| 117 | 120 | 121 | 122 | 123 | 124 | 127 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | |
| 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | | | | | | | | |
| Select all | | | | | | | | Clear selection | | | | | | | |

| Layer C | | | | | | | | | | | | | | | |
|-------------------|-----|-----|-----|-----|-----|-----|-----|------------------------|-----|-----|-----|-----|-----|-----|--|
| 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | |
| 217 | 220 | 221 | 222 | 223 | 224 | 227 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | |
| 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | | | | | | | | |
| Select all | | | | | | | | Clear selection | | | | | | | |

| Select Data | | | | | | | | | | | | | | | |
|------------------------------------|----------|----------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Modules Hardware parameters | | | | | | | | | | | | | | | |
| Alignments | | | | | | | | | | | | | | | |
| T0 modules | | | | | | | | | | | | | | | |
| T0 FEB-A | T0 FEB-B | T0 FEB-C | | | | | | | | | | | | | |
| Gains | | | | | | | | | | | | | | | |
| T0 channels | | | | | | | | | | | | | | | |
| View mode | | | | | | | | | | | | | | | |
| Edit mode | | | | | | | | | | | | | | | |
| Multiple | | | | | | | | | | | | | | | |
| Finish | | | | | | | | | | | | | | | |
| Edit | | | | | | | | | | | | | | | |
| Select dataset | | | | | | | | | | | | | | | |
| 2 2001-11-19 09:59:46 | | | | | | | | | | | | | | | |

Read 'Modules Hardware parameters' from Database ... Done

Hardware parameters. Modules: 10

| | |
|------------------|---------|
| TGATE (dec) | 208.0 |
| RUN_CTRL1 (dec) | 15.0 |
| RUN_CTRL2 (dec) | 15.0 |
| RUN_CTRL3 (dec) | 15.0 |
| RUN_CTRL4 (dec) | 15.0 |
| CHAN_EN1 (dec) | 65535.0 |
| CHAN_EN2 (dec) | 65535.0 |
| CHAN_EN3 (dec) | 65535.0 |
| CHAN_EN4 (dec) | 65535.0 |
| CHAN_EN5 (dec) | 65535.0 |
| CHAN_EN6 (dec) | 65535.0 |
| CB_CTRL (dec) | 527.0 |
| CB_STAT (dec) | 0.0 |
| WPTSA (dec) | 128.0 |
| PPTSA (dec) | 128.0 |
| WIRE_ISRSH (dec) | 96.0 |
| DLY_CSR1 (dec) | 18.0 |
| DLY_CSR2 (dec) | 0.0 |
| DLY_CSR3 (dec) | 36.0 |
| PLS_PS (dec) | 0.0 |
| PLS_DLY (dec) | 6144.0 |
| GBDELAY1 (dec) | 7.0 |
| GBDELAY2 (dec) | 173.0 |
| GBDELAY3 (dec) | 7.0 |
| GBDELAY4 (dec) | 41.0 |
| GBDELAYS (dec) | 21.0 |

Update

Muon PDT online db/dl gui: t-zeros

XDO: Muon System: PDT Muon Database Manager

| Layer A | | | | | | | | | | | | | | |
|-------------------|-----|-----|-----|-----|-----|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| 10 | 11 | 12 | 13 | 15 | 16 | 20 | 21 | 22 | 23 | 25 | 26 | | | |
| 33 | 35 | 36 | | | | | | | | | | | | |
| Select all | | | | | | Clear selection | | | | | | | | |
| Layer B | | | | | | | | | | | | | | |
| 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 110 | 111 | 112 | 113 | 114 | 115 | 116 |
| 117 | 120 | 121 | 122 | 123 | 124 | 127 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 |
| 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | | | | | | | |
| Select all | | | | | | Clear selection | | | | | | | | |
| Layer C | | | | | | | | | | | | | | |
| 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 210 | 211 | 212 | 213 | 214 | 215 | 216 |
| 217 | 220 | 221 | 222 | 223 | 224 | 227 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 |
| 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | | | | | | | |
| Select all | | | | | | Clear selection | | | | | | | | |

| 200 | | | 201 | | | 202 | | | 203 | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| 204 | | | 205 | | | 206 | | | 207 | | | 210 | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 2 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| 211 | | | 212 | | | 213 | | | 214 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | | | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| 215 | | | 216 | | | 217 | | | 220 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | | | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| 221 | | | 222 | | | 223 | | | 224 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | | | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| 227 | | | 230 | | | 231 | | | 232 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | | | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| 233 | | | 234 | | | 235 | | | 236 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | | | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| 237 | | | 240 | | | 241 | | | 242 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 2 | | | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| 243 | | | 244 | | | 245 | | | 246 | | | 247 | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Read 'Modules Hardware parameters' from Database ... Done
 Read 'T0 FEB' from Database ... Done